

19

what is claimed is :  
~~CLAIMS~~

1. A process for upgrading a titaniferous material by removal of impurities which process includes the steps of:-

5 (i) heating a titaniferous material to a temperature of less than 1300°C to produce a solid titaniferous phase and a liquid oxide or glassy phase in the presence of sufficient of compounds which encourage the formation of the liquid oxide or glassy phase;

10 (ii) cooling the product of step (i) to form a solidified material comprising the titaniferous phase and an impurity bearing phase at a rate sufficient to ensure the susceptibility of the impurity bearing phase to leaching in either an acid or alkaline leachant; and

15 (iii) leaching the solidified material with an acidic or alkaline leachant to leach at least a portion of the impurities.

2. A process for upgrading a titaniferous material according to Claim 1 wherein the compounds which encourage the formation of the liquid oxide or glassy phase at a temperature below 1300°C are compounds of sodium, potassium, lithium, phosphorus, silicon or boron.

3. A process ~~for upgrading a titaniferous mineral~~ according to Claim <sup>18</sup> 2, wherein the <sup>additive comprises</sup> ~~compound of sodium is~~ caustic soda.

4. A process ~~for upgrading a titaniferous mineral~~ according to Claim <sup>18</sup> 2, wherein the <sup>additive comprises</sup> ~~compound of sodium is~~ sodium carbonate.

B  
B  
5. A process ~~for upgrading a titaniferous mineral~~ according to Claim <sup>18</sup>2, wherein the ~~compounds~~ <sup>additive comprises</sup> include borax.

B  
B  
5 6. A process ~~for upgrading a titaniferous mineral~~ according to Claim <sup>18</sup>2, wherein the ~~compounds~~ <sup>additive comprises</sup> comprise a mixture of soda ash and borax.

Sub B5  
10 7. A process according to Claim 6, wherein the titaniferous material is heated to a maximum temperature of 1000°C for a period which avoids substantial reduction to metal of contained iron oxides.

15 8. A process according to Claim 7, wherein the solidified material is leached with water.

20 9. A process according to Claim 7, wherein the solidified material is leached with a recycled solution of leach liquor containing sodium silicate and borax to form a leachate and a residue.

B  
B  
25 10. A process according to Claim 9, wherein the leachate is separated from the residue and the residue is leached with <sup>1-20 wt. %</sup> hydrochloric acid ~~having an acid strength in a range from 1 to 20% hydrochloric acid.~~

Sub B4  
30 11. A process according to claim 1 wherein the compounds include compounds which extend the effect of other compounds.

B  
12. A process according to claim 11, wherein a compound which extends the effect of other compounds is borax.

B  
B  
13. A process according to claim <sup>17</sup>1 wherein sufficient <sup>additive is</sup> ~~compounds are~~ present to avoid the formation of titanate

phases that are not amenable to subsequent leaching.

B 14. A process according to claim 1<sup>17</sup> wherein the solidified material is leached under mild conditions.

5

B 15. A process according to claim 14, wherein the solidified material is leached at atmospheric pressure.

16. An upgraded titaniferous material produced by the process of ~~any one of claims 1 to 13.~~

10

add  
B.1

Insert  
B1

, next page